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UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of Jerrold Franklin <i>et al.</i>	}	Date: June 16, 2004
Application No. 10/068,154		Group Art Unit: 1745
Filed: February 6, 2002		Examiner: Gregg Cantelmo
For: Compliant Contacts for Fuel Cell Use		Attorney Ref. No.: 109.06

Declaration of Jerrold Franklin, Ph.D.

I, Jerrold E. Franklin make this declaration of my own personal knowledge, and I could and would competently testify to these matters if called upon to do so:

1. I am one of the inventors on the above-referenced application. I have over 26 years of engineering experience in advanced materials and processes, rocket engine technology, high temperature environments, and design for manufacturing and assembly. I am currently Chief Technology Officer for Altergy Systems, a fuel cell company in Gold River, California that I co-founded. Prior to forming Altergy, I was as Director of Technology for PIC, Director of Technology for Manufacturing Technologies Corporation, and engineering project manager and project engineer for GenCorp Aerojet. I hold a Ph.D. in engineering/materials science, a Master of Engineering and a BA degree from University California, Davis, and a BS degree in mechanical engineering from California State University, Sacramento. A true and correct copy of my curriculum vitae is attached hereto.
2. Because of my experience and education, I believe that I familiar with many of the terms used in the fuel cell industry.
3. In particular, a person skilled in the art of fuel cell design would understand that a "bipolar separator plate" denotes an electrically conductive component that serves as an anode for one cell, and a cathode for an adjacent fuel cell.

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4. Likewise, a person skilled in the art of fuel cell design would understand that a fuel cell "stack" is a group of fuel cells arranged in series, wherein the bipolar separator plate of one fuel cell serves as the anode or cathode for an adjacent cell.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. I understand that willful false statements and the like are punishable by fine or imprisonment or both, and may jeopardize the validity of the application or any patent issuing thereon.



Jerrold E. Franklin, Ph.D.

Executed this 16th day of June, 2004

Jerrold E. Franklin, PhD

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Gold River, California 95670

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Professional Experience:

- Twenty-six years of increasingly responsible engineering experience combining hands-on technical expertise, project management, design, analysis, fabrication, testing, research and development, and customer relations.
- Eight years of involvement with PEM fuel cell design and fabrication with emphasis on design for manufacture and cost reduction.
- The use of non-traditional materials and fabrication technologies such as super alloys, titanium, iridium, rhenium, diffusion bonding, diffusion brazing, photochemical machining, physical and chemical vapor deposition, laser and electron beam welding as well as traditional fabrication techniques.
- Management of project technical direction, engineering, design, budget, schedule, vendor evaluation and selection, customer relations, and reporting for internal and contract development projects.
- Team Leader and Project Engineer for a variety of development projects and materials and processes studies, providing technical and administrative leadership for project teams of engineers, designers, and technicians.

Major Projects:

- Primary design of Portable Fuel Cell Power System, Patents Pending.
- Technical Lead: Aerojet Fuel Cell Development Team using laminated material fabrication techniques. Patent Issued.
- Design and Fabrication of Convectively Cooled Combustion Liner. Patent Issued.
- Project Engineer: Ceramic Platelet Heat Exchanger, Ceramic Platelet Radome, and Ceramic Platelet Bi-Propellant Injector Programs.
- Project Engineer: Iridium/Rhenium High Performance, Radiation Cooled, 100 lbf. Liquid Rocket Engine Program.

Employment:

2001 to Present: Vice President of Engineering/Chief Technical Officer, Altergy Systems, Gold River, California.

1999 to 2001: Director of Technology, PIC, Folsom, California.

1997 to 1999: Director of Engineering, MTC, El Dorado Hills, California.

1996 to 1997: Materials Scientist, Vacuum Process Engineering, Sacramento, California.

1987 to 1996: Senior Engineer, Research and Technology and Applied Research Projects Departments; Project Engineering Specialist, Materials and Processes and Platelet Products Departments, Aerojet Propulsion Division, Sacramento, California.

1982 to 1986: Graduate Study, Engineering/Materials Science, University of California, Davis.

1982 to 1985: Teaching Assistant/Associate Instructor, Materials Science Teaching Laboratory, University of California, Davis.

Jerrold E. Franklin, PhD, Cont.

Education:

- Ph.D.** Engineering/Materials Science, University of California, Davis. Dissertation: *Hydrostatic Pressure Effects on Superplastic 7475-E Aluminum Alloy.*
- M. Eng.** Engineering/Materials Science, University of California, Davis. Project: *Design and Construction of Elevated Temperature Tensile Test Apparatus.*
- B. S.** Mechanical Engineering, California State University, Sacramento.
- B. A.** Geography, University of California, Davis.

Professional Development:

- "Product Design for Assembly," University of Wisconsin, Madison.
- "Designing Plastic Parts for Assembly," University of Wisconsin, Madison.
- "Designing Metal Stamping for Assembly," University of Wisconsin, Madison.
- "Project Management," Fred Pryor Seminars.
- "Personal Law for Managers," University California, Davis.
- "Mid Management Development Program," University of California, Davis.
- Hazardous Materials Training.

Honors and Patents:

1991 Best Paper, AIAA/SAE/ASME 28 Joint Propulsion Conference, Sacramento, California: "Hydrocarbon-Fuel/Copper Combustion Chamber Liner Compatibility, Corrosion Prevention, and Refurbishment", S. D. Rosenberg, M. L. Gage, G. D. Homer and J. E. Franklin. AIAA Paper No. 91-2215.

1993 Aerojet Propulsion Division Technical Achievement Award: "Aerojet's AJ10-221 High Performance, Radiation Cooled, 490-N Liquid Rocket Engine."

United States Patent, Number 5,737,922, "Convectively Cooled Liner for a Combustor", Leonard Schoenman and Jerrold E. Franklin, April 14, 1998.

United States Patent, Number 5,863,671, "Plastic Platelet Fuel Cells Employing Integrated Fluid Management," Spear, Jr., Reginald G.; Franklin, Jerrold E.; Hayes, William A.; Janke, David E., January 26, 1999

United States Patent Application, "Integrated and Modular BSP/MEA/Manifold Plates for Fuel Cells," 2001.

PCT Application, "Integrated and Modular BSP/MEA/Manifold Plates and Compliant Contacts for Fuel Cells," 2001

United States Patent Application, "Compliant Electrical Contacts for Fuel Cell Use," 2002.

United States Patent Application, "Integrated Fuel Cell Power System," 2002.

PCT Application, "Integrated Fuel Cell Power System," 2002.

United States Patent Application, "Electrical Contacts for Fuel Cells," 2003.

PTC Application, "Electrical Contacts for Fuel Cells," 2003.

United States Patent Application, "Protection Circuits for Hybrid Power Systems," 2004.

Memberships:

Tau Beta Pi, Engineering Honor Society

Phi Kappa Phi, Academic Honor Society

Jerrold E. Franklin, PhD, Cont.

Publications/Papers:

1. M. K. Rao, J. E. Franklin and A. K. Mukherjee, "Superplastic Deformation and Cavitation Phenomenon in 7475-Aluminum Alloy", *Proceedings of ICSMA-7*, Montreal, Canada, 1985.
2. M. Meier, J. E. Franklin and J. F. Shackelford, *Laboratory Manual for E-45, Properties of Materials*. Department of Mechanical Engineering, University of California, Davis, 1986.
3. A. Chokshi, J. E. Franklin and A. K. Mukherjee, "Effect of Hydrostatic Pressure on High Temperature Cavitation in Superplastic Aluminum Alloy". Fifth International Conference on Mechanical Behavior of Materials, Beijing, China, 1987.
4. J. E. Franklin, J. Mukhopadhyay and A. K. Mukherjee, "On the Effects of Hydrostatic Pressure on Mechanical Properties of 7475 Aluminum Alloy", *Scripta Metallurgical*, 22, [6], 865-870, 1988.
5. D. Berkman Morgan, T. Nguyentat, J. E. Franklin and A. C. Kobayashi, "Investigation of Copper Alloy Combustion Chamber Degradation by Blanching". Advanced Earth-to-Orbit Propulsion Technology Conference, Huntsville, Alabama, 1988.
6. M. A. Appel, L. Schoenman, J. E. Franklin and P. T. Lansaw, "Feasibility Demonstration of a 445N High-Performance Rocket Engine". JANNAF Propulsion Conference, Cleveland, Ohio, May, 1989.
7. D. B. Morgan and J. E. Franklin, "Hot-Fire Test Investigation of Copper Combustion Chamber Blanching". JANNAF Propulsion Conference, Cleveland, Ohio, May 1989.
8. J. Franklin, "Lightweight Ceramic Components for Propulsion Application". AIAA Paper No. 91-2217, AIAA/SAE/ASME 27th Joint Propulsion Conference, Sacramento, California, June 1991.
9. J. C. Hamilton, N. Y. C. Yang, W. M. Clift, D. R. Boehme, K. F. McCarty and J. Franklin, "Diffusion Mechanisms in Iridium-Coated Rhenium for High-Temperature, Radiation-Cooled Rocket Thrusters". AIAA Paper No. 91-2215, AIAA/SAE/ASME 27th Joint Propulsion Conference, Sacramento, California, June 1991.
10. S. D. Rosenberg, M. L. Gage, G. D. Homer and J. E. Franklin, "Hydrocarbon-Fuel/Copper Combustion Chamber Liner Compatibility, Corrosion Prevention, and Refurbishment". AIAA Paper No. 91-2215, AIAA/SAE/ASME 28th Joint Propulsion Conference, Sacramento, California, June 1991.
11. J. C. Hamilton, N. Y. C. Yang, W. M. Clift, D. R. Boehme, K. F. McCarty and J. E. Franklin, "Diffusion Mechanisms in Chemical Vapor-Deposited Iridium Coated on Chemical Vapor-Deposited Rhenium". *Metallurgical Transactions A*, 23A, 851-855, March 1992.
12. S. D. Rosenberg, M. L. Gage, G. D. Homer and J. E. Franklin, "Hydrocarbon-Fuel/Copper Combustion Chamber Liner Compatibility, Corrosion Prevention, and Refurbishment". *Journal of Propulsion and Power*, 8 [4] 1200-1207, November-December 1992.
13. J. E. Franklin and L. Schoenman, "Cooled Silicon Nitride Structures". AIAA Paper No. 93-2404, AIAA/SAE/ASME 29th Joint Propulsion Conference, Monterey, California, June 1993.
14. J. E. Franklin, "Fabrication of Ceramic Fluidic Devices for High Performance Applications." AIAA Paper No. 05-b6 alt., 4th Annual AIAA/BMDO Technology Readiness Conference, Natick, Massachusetts, July 1995.